BEAVERKILL BRIDGE
National Covered Bridges Recording Project
Spanning Beaver Kill, TR 30 (Craigie Claire Road)
Roscoe vicinity
Sullivan County
New York

HAER NY-329
NY-329

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

BEAVERKILL BRIDGE

HAER No. NY-329

LOCATION:	Spanning Beaver Kill, TR 30 (Craigie Claire Road), Roscoe Vicinity, Sullivan County, New York UTM: 18.513568E.4647736N, Livingston Manor, NY Quad.
STRUCTURAL TYPE:	Wood covered bridge, modified Town lattice truss
DATE OF CONSTRUCTION:	1865
DESIGNER/ BUILDER:	John Davidson, Shin Creek, Rockland Township, New York
PRESENT OWNER:	Sullivan County, New York
PREVIOUS USE:	Vehicular bridge
PRESENT USE:	Vehicular bridge
SIGNIFICANCE:	The Beaverkill Bridge is a distinctive regional variation of a Town lattice truss with fanlike radiating planks in the end panels. It is the best preserved of three surviving examples of this type, all of which are attributed to John Davidson, a local carpenter-builder.
HISTORIAN:	Researched and written by Lola Bennett, with additions by Joseph Conwill, based on new information found in the Richard Sanders Allen Collection, National Society for the Preservation of Covered Bridges, February 2003.
PROJECT INFORMATION:	The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is part of the Historic American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

Chronology

1815—Road built through Beaverkill Valley

1820—Ithiel Town receives patent for Town lattice truss

1865—Beaverkill Bridge built by John Davidson

1940s—CCC builds recreational facilities at Beaverkill Bridge

1958—Ownership of bridge conveyed to Sullivan County

1958—West stone abutment faced and capped with concrete

1960—New siding and roof; window eliminated

1982—West approach span constructed to stop water from draining into bridge

1991—East approach embankment extended toward abutment (stone-filled gabion baskets built as retaining walls); trunnels replaced; new roof

1993—Portion of bottom chord replaced; reinforced concrete pier cap poured on top of existing stone pier (shifting stones and distress cracks noted)

1997—Timber running boards replaced; major structural repairs to correct damage from overweight vehicles

1998—Sullivan County Department of Public Works opposes National Register listing

1999—Height restrictors placed at either end of bridge

2001—Bridge inspection report rates bridge at 3 tons

Description

The Beaverkill Bridge is a single-span Town lattice wooden covered bridge on one concrete-faced abutment and one stone pier. The total length of the bridge is 117' along the lower chord, the clear span measuring 96'-7". The truss is 13'-8" high from the top of the upper chord to the bottom of the lower chord, and the bridge is 16'-0" wide overall with a roadway width of 13'-0". There is a steel I-beam stringer approach span (11'-0" span) at the east end of the bridge.

The truss is framed in the manner patented by Ithiel Town in 1820, except at the ends where a series of four planks radiate in a fanlike pattern from the bearing point. The upper and lower chords are a pair of parallel 6x12" beams, each formed by a pair of parallel 3x12" planks. There is a secondary chord above the lower chord at the level of the deck.[1] The lattice web is sandwiched between the three chords and fastened at each intersection with four 2"-diameter treenails. The web itself is comprised of 3x10" planks, two and a half diamonds high, fastened with pairs of 2"-diameter treenails at each intersection. The timber is hemlock.[2]

The upper lateral system is composed of tie beams seated on the upper chord and diagonal cross bracing and transverse metal rods between the tie beams. There are sway braces between the lattice web and tie beams. Metal roofing fastened to timber nailers on the rafters covers the gable roof.

The floor system is composed of 8x14" wooden floor beams (planks, bolted together) placed transversely. The beams rest on the lower chord and the lower lateral bracing is fastened between them. Eight lines of irregularly spaced wooden joists, or stringers, are laid on top of the floor beams and support the wood plank deck. Bedding timbers on the abutment seats support the ends of the lower chords. Four of the floor beams extend beyond the exterior face of the bridge where they are tied to the upper chord with wood-frame sway braces.

Weathered board and batten siding covers the exterior of the bridge to about 1' below the upper chord. The sheathing is fastened to wooden nailers on the outer face of the truss. The portals are straight, with slightly projecting pediments and small triangular shelter panels just inside the entrance. Height restrictors (metal bars with wooden sheathing) have been installed at either end of the bridge a short distance from the portals.

The abutments and pier were originally built of drylaid stone slabs. The westerly abutment has been faced and capped with concrete; the easterly abutment has a poured concrete cap.

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[1] Town lattice trusses often incorporated secondary chords at the top and bottom of the truss in the 1820s, and Town specified them in his second patent (1835). According to covered bridge historian Joseph Conwill, "Here, the upper secondary chord is missing, and along with it, half a row of diamonds. This is a regional style found in the Catskills but it is occasionally found elsewhere."

[2] Letter from J.D. Davidson (the builder's son) to Richard Sanders Allen, December 8, 1942, National Society for the Preservation of Covered Bridges archives (hereafter cited as NSPCB), Buckingham Library, Westminster, Vermont.

New York Covered Bridges

At least 250 covered bridges are known to have existed in New York State.[3] By 1942, floods, fires, and neglect had taken their toll and only forty-six covered bridges remained.[4] According to the World Guide to Covered Bridges, today there are thirty-two surviving examples, with the majority located in and around the Catskills. Their dates range from a reported 1825 date to 1991, with the majority (53 percent) representing the period from 1850-1880. They represent many truss types, with Town lattice having the strongest representation with sixteen examples.

History of Bridge and Site

In 1815, John Hunter, an early settler, completed the road that opened this region of the Catskills to settlements at Shin Creek, Beaverkill, Craigie Claire, Turnwood and Rockland. This area was found to be a natural breeding ground for trout, as well as source of tannin (an extract from hemlock bark) and substantial waterpower for tanneries. In 1832 Linus Babcock established the first tannery in Beaverkill Valley at a site near the present covered bridge. Presumably, there was a bridge at or near this location by that date, although no documentation has been found concerning this.

By the 1860s, there were eight tanneries along the river. Nevertheless, the area remained largely wilderness throughout the nineteenth century. In 1872, according to Hamilton Childs's Gazetteer and Business Directory of Sullivan County, the Town of Rockland "presents a wild and uninviting appearance to the immigrant in search of a home, and its distance from any great public thoroughfare has tended to retard its growth and increase in population."[5] At that date, the hamlet of Beaverkill contained "a school, a tannery, … a blacksmith shop and about one hundred inhabitants."[6]

In 1865, John Davidson (from the neighboring community of Shin Creek) built a covered bridge at Beaverkill for the Town of Rockland.[7] He had previously built other covered bridges in the area, including the existing Van Tran Flat Bridge near Livingston Manor, and the Bendo Bridge near Willowemoc. Davidson is also credited with the construction of the Van Tran Flat Covered Bridge near Livingston Manor and the Bendo Covered Bridge near Willowemoc, which originally also stood at Livingston Manor. Beaverkill was his last bridge. The Beaverkill crossing clearly appears on the 1875 map of Rockland in Beers Atlas of Sullivan County, next to

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[3] Richard Sanders Allen, Covered Bridges of the Northeast (Brattleboro: The Stephen Green Press, 1957).
[4] Richard Sanders Allen, "New York State Covered Bridges," Highway Topics, December 1942.
[5] Hamilton Child, Gazetteer and Business Directory of Sullivan County, p.196-A.
[6] Ibid., p.196-B.
[7] Unfortunately, no primary sources have been located proving that John Davidson built Beaverkill Bridge, although the builder's son J. D. Davidson of Livingston Manor says that he did (letter of Dec. 8, 1942). Descendents of Thomas Davidson, a younger brother of John, say that "Tom" in fact built the bridge. See letters of 1975 between Richard Sanders Allen and Mrs. Lafayette Glover of East Randolph, NY in NSPCB archives. The Delaware County Biographical Review (1895) states that carpenter and bridge-builder James W. Coulter built the bridges at Beaverkill, Okego, and Cooks Falls (cited in Powell and Barnhart's 1999 history of the Beaverkill Valley, p. 94; other sources credit Cooks Falls to John Davidson). It is possible, and indeed likely, that all three men were involved in the construction somehow, perhaps as contractor, construction superintendent, and boss. No written documentation was found concerning the bridges in either Rockland Town Records or Sullivan County Records.

the site of Babcock & Ellsworth's tannery. Apparently, it remained a town bridge until Sullivan County took it over in 1958.[8] No primary sources have been found to document who was responsible for authorizing and funding this construction, but presumably it was Rockland Township, as Sullivan County gained jurisdiction of the bridge in 1958 and the hamlet of Beaverkill would probably not have been able to finance a bridge of this size. No further information has been found concerning its construction.

The tanners soon destroyed the "hemlocks in the Beaverkill and Willowemoc watershed. The industry peaked about twenty years after it had begun and then slowly declined, closing shortly after 1885."[9] By that time, the Catskills were beginning to develop as a resort and recreational area. Fishermen and summer tourists came in droves from New York City and environs. By the turn of the century, fishing camps had been established along Beaver Kill and its tributaries. Present-day Beaverkill State Park was established in the 1940s as a Civilian Conservation Corps (CCC) project. While the CCC was primarily engaged in improving stream habitats along the rivers and streams, they also improved public access to the area and built camping and recreational facilities.[10] Beaverkill Pool, adjacent to the bridge, said to be one of the most famous pools for large trout, was one such project. Cabins, bathhouses, beach, fences and picnic areas were built for a public campground at the east end of the bridge.

John Davidson

John Davidson (1815-1875) was born in Scotland in 1815 and immigrated to America with his family four years later. The son of a shepherd, Davidson grew up on the family farm in Delaware County near Downsville, New York. In 1845, he married and settled on a farm at Shin Creek in the upper Beaverkill Valley; the hamlet is now known as Lew Beach. In addition to building bridges, he was a lumberman and sawmill owner. He rafted lumber down the Beaverkill from as far up as Craigie Clair.[11] On August 5, 1875, falling logs at the Voorhees mill killed Davidson. He and his wife, Amanda, had fourteen children.

Town Lattice Truss

Ithiel Town was born in Thompson, Connecticut in 1784 and died in New Haven in 1844. As a young man he learned carpentry and later studied architecture at Asher Benjamin's school in Boston. For most of his life, he practiced architecture, primarily as a partner in the New York City firm of Town & Davis. Town designed a number of noteworthy buildings, including Christ Church in Hartford (1825), the New York City Custom House (1837), the Yale College Library (1842), and the Virginia State Capitol at Richmond (1842). Although he is primarily recognized

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[8] According to the Rockland Town Clerk's Office, the Supervisor's Minutes begin in 1884, and no county records were made available for research during the course of this project. Likewise, apparently no local newspapers existed or have survived from this period.
[9] Ed Van Put, The Beaverkill: The History of a River and its People (New York: Lyons & Burford, 1996), p.46.
[10] Van Put, p.256.
[11] Letter, Davidson to Allen, December 8, 1942, NSPCB archives.

as an architect, Town also made a significant contribution to the field of engineering when, in 1820, he was granted a patent for a truss bridge. In 1820, Eli Whitney wrote Town a letter regarding his bridge design, in which he stated:

> It appears to me to be much lighter, in proportion to its strength, than any other wooden bridge which I have seen; a consideration of much importance, both as respects expense, and the greater ease with which it supports its own weight….On the whole, its simplicity, lightness, strength, cheapness and durability, are, in my opinion, such as to render it highly worthy of attention.

Town's design consisted of two layers of overlapping planks, with each layer arranged at an angle to the chords, forming a lattice fastened together with wooden pins or treenails at each intersection. The most significant feature of this design was that it could be quickly erected and utilized sawn planks instead of heavy hewn timbers. As Town explained in his 1821 pamphlet, "A Description of Ithiel Town's Improvement in the Construction of Wood and Iron Bridges," this new method of bridge construction was designed to be "the most simple, permanent, and economical, both in erecting and repairing."[12]

The lattice design actually functioned as a series of overlapping triangles so that the load in any one triangle affected distribution of stress in all other triangles. Because the webs were fastened at every intersection, no triangle could function independently, and, as bridge historian Richard Sanders Allen points out, "Therein lay the great strength of the Town truss. It was a real invention, not resembling any design advanced for wooden spans in the thousands of years before its time that bridges had been built."[13] Because it did not rely on European precedents, the Town Lattice is considered "the first truly American design" for a bridge truss.[14]

Town received a second patent in 1835, adding a second lattice web, which was used primarily for railroad bridges. Town built only a few bridges himself, but aggressively promoted his truss design through agents who sold the rights to use his patent at $1 per foot of bridge. It is said that Town actually derived more income from his engineering work than from his architectural practice.[15] Even after Town's death in 1844, the Town lattice system continued to be used for bridges well into the twentieth century. Its popularity was based on a number of factors: it used small, reasonably sized lumber; it required a minimal amount of intricate framing, allowing it to be easily erected by local unskilled labor; it could span up to 200'; and it showed stress long before collapse would occur.[16]

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[12] Ithiel Town, "A Description of Ithiel Town's Improvement in the Construction of Wood and Iron Bridges, Intended as a General System of Bridge-Building," (New Haven: S. Converse, 1821), p.4.
[13] Richard Sanders Allen, Covered Bridges of the Northeast (Brattleboro: Stephen Greene Press, 1957), p.15.
[14] Raymond E. Wilson, "Twenty Different Ways to Build a Covered Bridge," Technology Review [Massachusetts Institute of Technology], May 1971.
[15] Henry F. Withey and Elsie Rathburn Withey, "Ithiel Town," biographical sketch in Biographical Dictionary of American Architects (Deceased) (Detroit: Omnigraphics, 1970), p.604.
[16] Brenda Krekeler, Covered Bridges Today (Canton, Ohio: Daring Books, 1988), p. 19.

Thousands of Town lattice trusses were built in the United States in the nineteenth century, but there are only about 150 surviving examples in the United States today, and these are located primarily in the northeastern states.[17]

The Beaverkill Bridge is a distinctive regional variation of this type, with fanlike radiating planks at the ends of the trusses. According to covered bridge historian Joseph Conwill, "the standard Town lattice distributes the load over a section of several feet of the lower chord at the ends, requiring long truss seats on the abutments, long corbel timbers, or both," whereas the radiating planks distribute the load over a smaller area, thereby eliminating the need for long abutment seats or bolster beams.[18] Similar fanlike end braces were found in a few New Hampshire covered bridges, but this construction is unusual. The other two New York State bridges that follow this pattern are the Van Tran Flat Bridge (1860) and Bendo Bridge (1860), both of which are also attributed to John Davidson. Radiating planks are also seen in a patent obtained in 1863 by John C. Briggs, so the concept may have been known and practiced in the engineering world by the time Davidson built his bridges.[19]

Subsequent History of the Bridge

No records of maintenance or repairs have been found from the bridge's construction in 1865 to 1958, when it was turned over to the jurisdiction of the county. Since that time, it has undergone periodic, and sometimes extensive repairs, to allow it to continue to carry traffic. While the Sullivan County Department of Public Works has done a good job maintaining the bridge, they have adamantly opposed having the bridge listed on the National Register, because they believe it may conflict with their primary mission of promoting safety and convenience of the traveling public. The Beaverkill Covered Bridge Committee has concurred with them in not seeking National Register listing, stating: "We do not support any effort to register the bridge as a historic structure and maintain that the funding to be gained will hardly make up for the costs associated with the restrictions placed and result in additional administration costs as well."[20]

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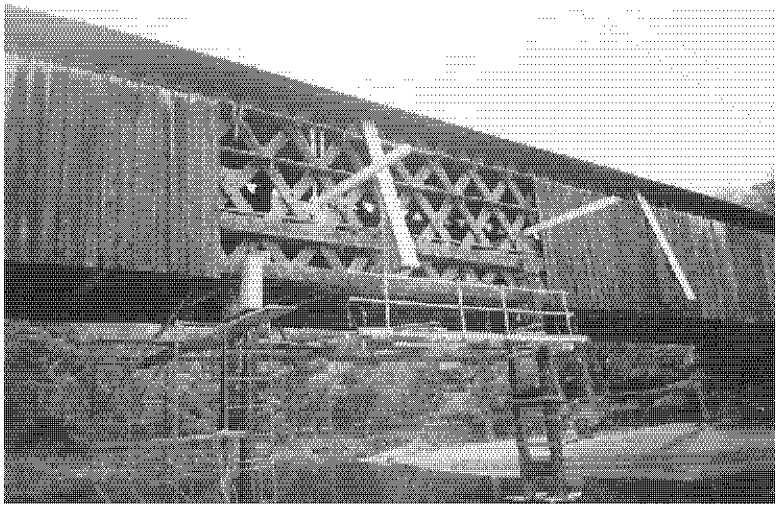
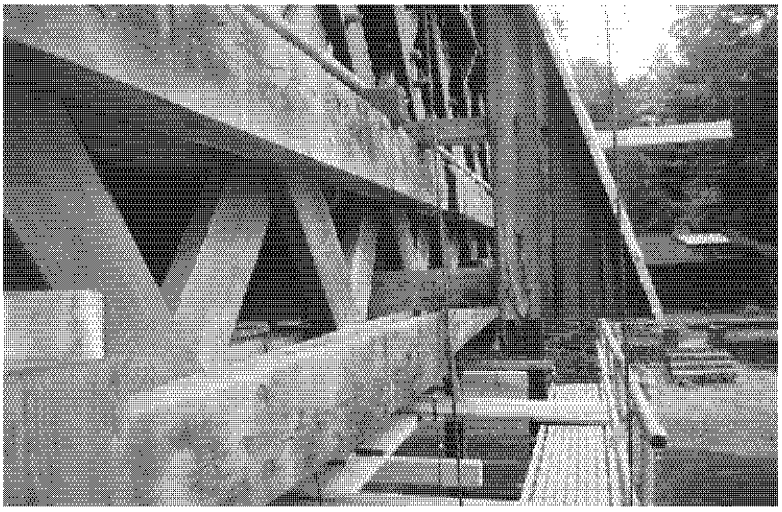
[17] National Society for the Preservation of Covered Bridges, World Guide to Covered Bridges, computer database printout, April 2002.
[18] Joseph Conwill, "Thirty American Covered Bridges Worthy of Special Recognition," typed notes for National Covered Bridges Recording Project, 2002.
[19] F.B. Brock, "Truss Bridges, An Illustrated Historical Description of all Expired Patents on Truss Bridges," Engineering News and American Contract Journal (October 23, 1882-September 8, 1883), p.348-49.
[20] Letter on file at Sullivan County Department of Public Works.

Appendix A, Photographs

The following photographs are of the rehabilitation of Beaverkill Bridge in September 1997. Courtesy of Peter Lilholt, Commissioner of Public Works, Monticello, New York.





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